SPECIFICATION:

Page 10, first paragraph, replace with the following new paragraph:

For affine coordinates [(a_4, b_4)] $\underline{(\alpha_4, \beta_4)}$ it can be shown that there is a viewpoint in which the projection of the point P_4 has those affine coordinates. The point p_{b4} lies on the basis plane with affine coordinates [(a_4, b_4)] $\underline{(\alpha_4, \beta_4)}$ for the basis (P_1, P_2 ,P_3). The line passing through p_{b4} and P_4 sets this viewing direction. This line meets the image plane (whose normal is parallel to the line) at a point q_4. That is, q_4 is the image of P_4. In a similar manner, P_1, P_2 ,P_3 are projected into q_1, q_2 and q_3, respectively on this image plane. With (q_1, q_2, q_3) as the basis, one can easily observe that q_4 has the affine coordinates [(a_4, b_4)] $\underline{(\alpha_4, \beta_4)}$, even when we subject the points on the image plane to an affine transformation (which includes translation, rotation, and scaling, to name a few).

Page 10, second paragraph, replace with the following new paragraph:

The affine coordinates [(a_i, b_i)] $\underline{(\alpha_i, \beta_i)}$ of the projections of the remaining points (for this given view direction) are computed next as functions of [(a_4, b_4)] $\underline{(\alpha_4, \beta_4)}$. Let p_{bi} be the intersection point of the basis plane and the ray parallel to the viewing direction and passing through P_i. Let q_i be its projection on the image plane. As before, both p_{bi} and q_i have the affine coordinates [(a_i, b_i)] $\underline{(\alpha_i, \beta_i)}$ when the basis chosen are (P_1, P_2 ,P_3) and (q_1, q_2, q_3), respectively. Using similar triangles $P_4 p_{b4} p_{4'}$ and $P_i p_{bi} p_{i'}$ we have:

[[$p_{bi} - p_i = d_i (p_{b4} - p_i)/d_4$]]

$$\underline{p_{bi} - p_i = \frac{d_i}{d_4}(p_{b4} - p_4)}$$

Page 10, last paragraph, replace with the following new paragraph:

In terms of the [*a* affine coordinates] <u>α affine coordinates</u>, we express the above equation as:

$$\alpha_i = a_i + \frac{d_i}{d_4}(\alpha_4 - a_4)$$

A similar equation can be written for the [*b* coordinate values] <u>β coordinate values</u>. The slope of the [*b* coordinate values] <u>β coordinate values</u> is the same as that for the [*a* affine coordinates] <u>α affine coordinates</u> as in Figure 4

Page 11, first paragraph, replace with the following new paragraph:

Note that a_4, a_i , d_i and d_4 are constant over all possible images that can be generated for the given set of 3D points. Thus, for every possible image generated for (P_1, P_2 , ..., P_n) the plot of [[(a_4, a_i)]] $\underline{(\alpha_4, \alpha_i)}$ is a straight line with a slope d_i/d_4. The straight line passes through the points [[(a_4, a_i)]] $\underline{(\alpha_4, \alpha_i)}$ that is independent of the camera parameters, and depends solely on the 3D geometry of the points. The slope of the line is indicative of how far P_i is from the basis plane. This property will be next to estimate the structure of the human face from multiple images. Also if the equation of the affine lines are determined, then given a "target" image where we have identified the location of the

projection of (P_1, P_2, P_3, P_4), the projection of the *i*th point P_i in this image can be identified by computing (a_i, b_i), using the equation of the affine lines. Repeating this for all values of i will generate the novel view of the face synthetically.

Page 12, second paragraph, replace with the following new paragraph:

In the *k*th image ($k=1, \ldots, N_f$), let the image of point P_1 be q_1^k, and so on. Consider (q_1^k, q_2^k, q_3^k) as the basis. From the earlier section, it is known that, for any para perspective projection of five 3-D points (P_1, P_2, P_3, P_4, P_i), the affine coordinates of the projection of P_4 is related to that of the projection of P_i by the equation

$$\alpha_i^k = a_i + \frac{d_i}{d_4}(\alpha_4 - a_4)$$

where [[(a_4^k, b_4^k)]] $\underline{(\alpha_i^k, \beta_i^k)}$ are the affine coordinates of the projection of [[P_4]] $\underline{P_i}$ in the *k*th view, and so on.

Page 12, third paragraph, replace with the following new paragraph:

The right hand side of the equation is only a function of the unknown parameter $s_i = d_i/d_4$, which we formally call the *depth ratio*. Here, a_4 is known and is a race and gender dependent constant. The [[a_i^k]] $\underline{\beta_i^k}$ component can be estimated similarly as a function of s_i. Next, we compute $(x_i^k(s_i), y_i^k(s_i))$, the image coordinate values in the *k*th frame. The average sum of the squared difference measure of the intensity as a function of s_i, computed over every image pair chosen, is defined as follows.

$$SSD(s_i) = \frac{2}{N_f(N_f-1)} \sum_{k=1}^{N_f-1} \sum_{l=k+1}^{N_f} DIFF(win(k, x_i^k, y_i^k, w), win(l, x_i^k, y_i^k, w))$$

Here $win(k, x_i^k, y_i^k, w)$ is a window of size wxw selected in the kth image around the point (x_i^k, y_i^k). Also, $DIFF(.)$ is the sum of the squared difference computed for the window pair.